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## BIRDS COLLECTED DURING THE WHITNEY SOUTH SEA EXPEDITION. XXI[1]

### NOTES ON THICKHEADS (*PACHYCEPHALA*) FROM POLYNESIA

By Ernst Mayr

In a previous paper I discussed the classification of the thickheads from the Solomon Islands, and attempted to clarify the various taxonomic problems of this group. Practically the same questions arise with regard to the Polynesian members of the genus *Pachycephala*. Here, also, we find distinct and isolated forms on the one hand, and, on the other, groups of closely related populations. In these cases I apply the same principles that I used when dealing with the Solomon Islands forms. Concerning my methods of measurements, nomenclature of colors, and arrangement, I have followed the plan of the previous papers. I am greatly indebted to Mr. John T. Zimmer (New York), Norman B. Kinnear (London), and Jacques Berlioz (Paris), for much assistance and information.

#### *Pachycephala* in the New Hebrides and Banks Islands

The New Hebrides and Banks Islands are inhabited by a group of thickheads that show pronounced heterogynism. The males from the twenty islands from which I have examined collections show great uniformity and are in most cases indistinguishable; the females, however, although not strikingly different from each other, have characteristics of their own on almost every island. The variation is irregular, as usual in the New Hebrides, and no distinct tendency can be noticed in following the chain of islands from the south to the north. On the contrary, birds from the southern islands (Efate) are more similar to birds from the northern-most islands (Banks Islands) than to those from intermediate localities. An added problem is the individual variation, especially the occasional occurrence of a brownish phase. Such brownish coloration occurs in females now and then in almost any subspecies of *Pachycephala pectoralis*, but it sometimes affects the majority of the

[1]Previous papers in this series comprise American Museum Novitates, Nos. 115, 124, 149, 322, 337, 350, 356, 364, 365, 370, 419, 469, 486, 488, 489, 502, 504, 516, 520, and 522.

specimens. Such brownish populations are found in the New Hebrides for example on the islands of Efate and Aoba.

Thus far three names have been given to the thickheads of these islands, but one of them obviously by mistake, for Gray described the male and female as two different species. The material at hand permits a thorough study, and although every arrangement is somewhat artificial, five groups can be defined. The only alternative would be to ignore the differences altogether and unite the birds from the whole region under one name.

**Pachycephala pectoralis cucullata** (Gray)

*Eopsaltria cucullata* G. R. Gray, 1859, 'Cat. Birds Trop. Islands,' p. 21, Aneiteum [description of female].

Adult Male.—Similar to males of *chlorura* from Efate (see p. 3), but black on head and breast-band duller, feathers of crown and hind neck with rufous olive edges; olive of back duller, olive on edges of secondaries, on upper tail-coverts, and on tail washed with brownish, not pure olive.

Adult Female.—Somewhat similar to females of *chlorura* from Efate, but duller and more brownish; crown brownish, ear-coverts rufous cinnamon; back dull brownish-olive; throat white, some feathers with narrow pale brown tips; breast-band light grayish-brown and narrow; belly pale lemon-yellow with a slight tinge of ochre; yellow of under tail-coverts scarcely deeper; wing-coverts and wing-feathers edged with cinnamon-olive.

Immature Female.—Similar to adult, but bill brownish; wing-feathers softer and more brownish; upperside duller and underparts less yellowish.

Tarsus, 25–26; culmen, from base 19–19.5, exposed 12–13 (in adult males).

| | Wing | Tail |
|---|---|---|
| 2 ♂ ad. | 89, 89 | 67, 67 |
| 2 ♀ ad. | 84, 86.5 | 63, 65 |

Range.—Aneiteum Island, southern New Hebrides.

This form was originally described from a single female and considered a distinct species of *Eopsaltria* by many subsequent authors until Wiglesworth[1] in 1899 discovered its real systematic position. From that time on, *cucullata* was put into the synonymy of *chlorura*. It is doubtful, however, if this is the correct procedure, as the collections of the Whitney Expedition prove that the thickheads show a great deal of local variation in the New Hebrides. It is almost certain that the Erromango birds are not the same as the Aneiteum birds. The Whitney material from Aneiteum is unfortunately very meager, but the characters mentioned above were substantiated by Mr. Norman B. Kinnear (London), who compared my material with that of the British Museum. He writes

[1]Bull. Brit. Orn. Club, VIII, p. 44.

me that my two Aneiteum females agree very closely with the type of *cucullata*, and "the only differences appear to be that their heads are of a slightly browner tint, while the white on the underside and the yellow wash on the belly are not so pronounced," differences that may be due to the age of the type. The differences in the male plumage between the Efate birds and those from Aneiteum (as mentioned above) are also confirmed by the material of the British Museum, except for one adult male from Aneiteum, which is indistinguishable from Efate males.

### **Pachycephala pectoralis chlorura** Gray

*Pachycephala chlorurus* G. R. Gray, 1859, 'Cat. Birds Trop. Islands,' p. 20, "New Hebrides (Erromango, Aneiteum)," type locality hereby restricted to Erromango.

Adult Male.[1]—Forehead, crown, hind neck, lores, upper cheeks, ear-coverts, and narrow breast-band black; yellow nuchal collar narrow, in the middle mixed with olive; back, rump, scapulars, edges of wing-coverts, and secondaries citrine olive, edges of primaries partly grayish; throat white; breast, abdomen, and under tail-coverts rich lemon-yellow; axillaries and under wing-coverts white with light yellow tinge; tail dull citrine, blackish subterminal band across the lateral tail-feathers.

Adult Female.[1]—Crown more grayish olive, not brownish as in *cucullata;* ear-coverts brownish gray; back dull olive-citrine, without a distinct brownish tinge; edges of wing-feathers and tail-feathers dull citrine with less admixture of brownish than in *cucullata;* throat white, some feathers with very light and narrow grayish tips; breast-band light, narrow and grayish; belly pale lemon-yellow (about as in *cucullata*)), in two of six specimens mixed with ochre; yellow of under tail-coverts distinctly richer and darker than that of belly.

Immature Male and Female.—Similar to adult female, but belly lighter, with only a very slight tinge of yellow; olive of upperparts duller, crown strongly mixed with olive; secondaries and wing-coverts more or less rufous brown; in addition to these color characters there are the usual signs of immaturity in thickheads, as light bill, pointed tail-feathers, and soft and rounded wing-feathers.

Tarsus, 25–26; culmen, from base 19–20, exposed 12–13 (in adult males).

| Efate Island | Wing | Tail |
|---|---|---|
| 15 ♂ ad. | 83–88(85.5) | 61–65(63.1) |
| 6 ♀ ad. | 80–85(82.4) | 59–63(61.4) |
| 4 ♂ im. | 83, 84, 85 | 63–64(63.5) |
| 4 ♀ im. | 81–85(83.2) | 61–64(62.5) |

Range.—Erromango. For the present, I refer birds from Efate and Nguna Island to this race also.

The material on which Gray based the description of *P. chlorura* consisted apparently of two adult males, one from Erromango and one from Aneiteum (specimens *a* and *b*, in 'Cat. Birds Brit. Mus.,' VIII,

[1]The following descriptions are based on specimens from Efate.

p. 195). All the other material collected by Macgillivray and Brenchley was acquired by the British Museum a long time after the description of *chlorura*. The two original specimens have therefore to be considered as the cotypes of this species, and Gadow (ibidem, p. 195), as well as Sharpe (Ibis, 1900, p. 343), was not justified in calling the Erromango specimen the type. Everything depends in such cases on what the first reviser fixes as the type locality. A careful study of the existing literature reveals that the type locality has not been restricted up to the present.

The problem as it now stands is as follows: the males from the different islands cannot be distinguished with certainty; females, however, are not known from Erromango. The status of the Erromango Island race will remain doubtful, therefore, if Erromango be designated as type locality. On the other hand, Erromango has been considered, although erroneously, the type locality for so many years that it does not seem advisable to change it. I, therefore, restrict the type locality to Erromango, by which action the specimen *a* of the British Museum automatically becomes the type of *chlorura*.

Mr. Kinnear writes me that the type of *chlorura* can not be distinguished from Efate males, and we have to call the Efate specimens *chlorura* until a series of females becomes known from Erromango. Judging from other cases, it is rather probable that the Erromango and Efate birds are not the same, but this cannot be settled without a series of typical females.

**Pachycephala pectoralis brunneipectus,** new subspecies

TYPE.—No. 212778, Amer. Mus. Nat. Hist.; ♀ ad.; Epi Island, August 5, 1926; R. H. Beck and J. G. Correia.

ADULT MALE.—Like that of *chlorura* from Efate.

ADULT FEMALE.—Similar to that of *chlorura* from Efate, but breast-band more brownish and much wider; belly very pale yellow, under tail-coverts much deeper yellow (about empire yellow, R.IV); ear-coverts and crown very much more brownish than in *chlorura* from Efate; crown between snuff-brown (R.XXIX) and olive-brown (R.XL), ear-coverts lighter and less olive; back brownish olive, instead of greenish; olive edges of wing-feathers also more brownish.

IMMATURE MALE[1] (I. Phase).—Similar to adult female, but mandible yellow, maxilla brownish yellow; edges of wing-feathers and wing-coverts rufous; tail-feathers narrow and very pointed; throat with a faint yellowish wash; breast-band grayish olive; crown strongly washed with olive, contrasting with the more brownish ear-coverts; belly lighter yellow; back as in adult female.

IMMATURE MALE (II. Phase).—Bill black, throat white, a few feathers with dark tips; breast-band grayish, some feathers partly blackish; belly deeper yellow than in

[1]About the different male plumages of *Pachycephala* see: Mayr, 1932, Amer. Mus. Novit., No. 522, p. 11.

adult females, some almost as deep as in adult males; crown brownish as in adult females, but many feathers partly blackish; back, tail, and edges of wing-feathers more greenish than in females, but duller than in adult males.

IMMATURE FEMALE.—Very similar to immature male (I. Phase), but bill more brownish; head more brownish, less olive.

Tarsus, 25; culmen, from base, 20.

| | WING | TAIL |
|---|---|---|
| 15 ♂ ad. | 84–89(87.0) | 62–69(65.2) |
| 4 ♂ imm. (II. Phase) | 85–86(85.8) | 62–65(64.0) |
| 2 ♂ imm. (I. Phase) | 82, 84 | 65, 65 |
| 9 ♀ ad. | 83–89(86.0) | 64–68(65.4) |
| 4 ♀ imm. | 81–84(82.5) | 63–68(65.5) |

RANGE.—Epi group in the New Hebrides (Mai, Tongariki, Epi, Lopevi, Pauuma, and Ambrym).

The birds from these six islands form a very uniform population.

### **Pachycephala pectoralis intacta** Sharpe

*Pachycephala intacta* SHARPE, 1900, Ibis, p. 343, Sandwich Bay, Mallicolo [Malekula], New Hebrides.

ADULT MALE.—Almost identical with that of *chlorura* from Efate, but back usually more yellowish olive.

ADULT FEMALE.—(Malekula; 10 specimens). Characterized by the reduction of the lipochrome on abdomen and back; head brownish, darker and more cinnamon than in *brunneipectus;* ear-coverts duller brownish without any olive tinge; back dull brownish-olive, resembling that of *cucullata*, but more greenish toward the rump and without a rufous tinge; breast-band light and narrow as in *chlorura* from Efate, but brownish as in *brunneipectus*, not grayish; belly whitish, washed with pale lemon, edges of some feathers stronger yellow; under tail-coverts rich yellow, contrasting with the light-colored belly.

The birds from several other islands can be included in this race, but they differ slightly in the coloration of the females:

Santo (10 females examined).—Similar to typical *intacta*, but abdomen usually more strongly washed with yellow; breast-band, head and ear-coverts slightly more rufous; back averaging richer olive; white feathers of throat with broader cinnamon edges.

Malo (3 females examined).—In general intermediate between Malekula and Santo birds, but closer to Santo examples; on abdomen with more yellow than either.

Aoba (5 females examined).—The birds from Aoba are somewhat intermediate between this and the following subspecies. They have the belly as light-colored as the Malekula birds, but have crown and sides of the head much more grayish; four of the five females belong to a brown phase, which occurs frequently in this genus; they have flanks, wing-feathers, and tail-feathers strongly washed with brownish.

IMMATURE MALE (I. Phase).—Differs from adult female as in the other subspecies (see p. 4). Throat in this subspecies, however, only rarely washed with yellow; edges of primaries with only little brownish wash.

IMMATURE MALE (II. Phase).—Intermediate between immature (I. phase) and adult.

JUVENAL MALE.—One specimen (No. 218010) has still some of the rufous feathers of the juvenal plumage on breast, flanks, under tail-coverts and hind neck.

IMMATURE FEMALE.—Except for the usual characters of immaturity (on bill, wing and tail), similar to the adult female, but crown more olive and abdomen almost pure white.

| | | WING | TAIL |
|---|---|---|---|
| Malekula | 10 ♂ ad. | 86–90(87.5) | 61–67(64.7) |
| | 6 ♂ imm. (I. Phase) | 80–85(82.5) | 60–67(63.0) |
| | 10 ♀ ad. | 83–88(85.0) | 61–63(62.2) |
| | 5 ♀ imm. | 80–83(82.4) | 62–64(63.0) |
| Malo | 3 ♂ ad. | 82, 84, 85 | 60, 62, 63 |
| | 3 ♀ ad. | 81, 83, 85 | 58, 61, 61 |
| Santo | 10 ♂ ad. | 83–87(85.0) | 60–64(62.8) |
| | 10 ♀ ad. | 81–86(82.9) | 58–64(60.5) |
| Aoba | 8 ♂ ad. | 85–87(86.4) | 63–65(63.8) |
| | 5 ♀ ad. | 83–85(84.8) | 61–64(63.0) |

RANGE.—Malekula, Malo, Santo, Dolphin, and Aoba Islands, New Hebrides.

**Pachycephala pectoralis banksiana,** new subspecies

TYPE.—No. 216029, Amer. Mus. Nat. Hist.; ♀ ad.; Vanua Lava, Banks Islands; November 10, 1926; R. H. Beck and J. G. Correia.

ADULT MALE.—Similar to that of *chlorura* from Efate, but back usually duller and more greenish, less olive.

ADULT FEMALE.—Similar to that of *chlorura* from Efate, but head purer grayish-olive, with very little brownish; back darker and more greenish, less olive; breast-band light and narrow, more brownish and less grayish than in *chlorura* from Efate; differs from *intacta* by the yellow-colored belly.

Immature birds differ from the adults as in the other subspecies.

| | | WING | TAIL |
|---|---|---|---|
| Vanua Lava | 4 ♂ ad. | 85–88(86.8) | 61–64(62.8) |
| | 8 ♀ ad. | 83–87(84.5) | 57–62(60.5) |
| Bligh | 3 ♂ ad. | 85, 85 | 62, 63 |
| | 5 ♀ ad. | 83–84(83.8) | 59–61(59.8) |
| Gaua | 2 ♂ ad. | 88 | 63, 64 |
| | 3 ♀ ad. | 85, 86, 88 | 62, 63, 64 |
| Aurora | 4 ♂ ad. | 88–90(88.8) | 65–68(66.2) |
| Pentecost | 4 ♂ ad. | 86, 87, 87 | 65–67(66.0) |
| | 3 ♀ ad. | 88 | 62, 63, 66 |

RANGE.—Banks Islands (Vanua Lava, Bligh, and Gaua), and probably also northern New Hebrides (Aurora and Pentecost).

The birds from Bligh and Vanua Lava are typical. Specimens from Gaua have the belly lighter yellow and the head more brownish, thus approaching *intacta*. Three females from Pentecost are very worn, but

show in their characters more affinity to *banksiana* than to *intacta* or *brunneipectus;* they have a light and narrow breast-band, a yellowish belly and a grayish (brown) head. I provisionally unite, therefore, the specimens from Pentecost and Aurora with *banksiana.*

The specimens from Aurora and Pentecost are also slightly larger and have longer tails.

As a whole, this subspecies is very similar to *chlorura* from Efate, and I would not describe it, if it were not separated from the range of *chlorura* by the ranges of *brunneipectus* and *intacta.*

Most of the specimens were collected in November, shortly before the molting period; those collected in January are in full molt.

### *Pachycephala* IN THE SANTA CRUZ GROUP

The Santa Cruz Islands are inhabited by three well-defined forms of thickheads which seem to be more closely allied to the thickheads from the Fiji group than to those from the New Hebrides. Considering the small distance between Vanikoro, Utupua, and Santa Cruz, the distinctness of these three forms is very remarkable.

#### **Pachycephala pectoralis vanikorensis** Oustalet

*P.* [*achycephala*] *vanikorensis* OUSTALET, 1877, Bull. Soc. Philomath., (6) XI, p. 95, (1875), Vanikoro Island.

ADULT MALE.—Similar to *banksiana,* but back deeper olive, less yellowish; black breast-band on the average wider; tail not olive, but mostly black, only tips and basal edge of lateral tail-feathers pale olive; upper tail-coverts black, with dark olive edges; wing-feathers also more blackish than in *banksiana.*

ADULT FEMALE.—Not at all similar to that of *banksiana;* coloration of head sharply contrasting against that of back; forehead, crown and hind neck deep mouse-gray, centers of feathers darker, edges more grayish; ear-coverts, circumocular space. and upper cheeks grayish drab; back, rump, and upper tail-coverts olive-citrine; tail and edges of wing-feathers citrine; throat-feathers whitish with fuscous shaft-stripes, on lower throat with fuscous-buffy tips; breast-band narrow, in the middle buffy orange, on the sides more olive; feathers with dark shaft-stripes; lower breast, abdomen, and under tail-coverts lemon-chrome (R.IV).

IMMATURE MALE AND FEMALE (first-year plumage).—Similar to adult female, but throat pale lemon, not whitish; head olive, sides of head also washed with olive; greater wing-coverts and secondaries edged with rufous or rufous olive; tail-feathers pointed; bill not black, but pale horn-brown.

Tarsus, 24–26(24.8); culmen, from base 19.5–20, exposed 14–16 (in adult males).

| | WING | TAIL |
|---|---|---|
| ♂ ad. | 85–87(85.8) | 58–63(60.4) |
| ♀ ad. | 81–84(82.9) | 57–60(59.0) |

RANGE.—Vanikoro Island, Santa Cruz group.

This remarkable subspecies was discovered by Quoy and Gaimard on the expedition of the 'Astrolabe,' but was identified by them as the Australian *P. gutturalis*. Oustalet recognized the distinctness, but failed to emphasize the very distinct characters of the female. Although his description is not quite correct, there is no doubt that it was based on Vanikoro birds, as Mr. J. Berlioz assures me after an examination of the types. This subspecies differs from the Australian representatives, by the combination of a long bill and a short wing.

**Pachycephala pectoralis utupuæ**, new subspecies

TYPE.—No. 214308, Amer. Mus. Nat. Hist.; ♀ ad.; Utupua, Santa Cruz Islands; September 29, 1926; J. G. Correia.

ADULT MALE.—Similar to *vanikorensis*, but larger, bill longer; olive edges on wing-feathers and on tip of tail wider.

ADULT FEMALE.—Very unlike the *vanikorensis* female; coloration of head not sharply contrasting against that of back; forehead, crown and hind neck blackish gray with a fuscous-olive tinge; feathers with darker centers and lighter edges; scapulars and back rich brownish-olive, rump and upper tail-coverts purer olive; ear-coverts, circumocular space and upper cheeks drab; feathers of throat whitish, some with narrow grayish or cinnamon tips; breast-band wide, uniformly cinnamon; abdomen and under tail-coverts lemon-chrome; tail-feathers buffy- to olive-citrine; wing-coverts and wing-feathers edged with olive-cinnamon (isabella color, R.XXX).

IMMATURE MALE AND FEMALE (first-year plumage).—Similar to adult female, but bill brown, not black; yellow of abdomen paler and duller; throat sometimes tinged with yellowish; crown more strongly washed with brownish olive; greater wing-coverts and secondaries edged with rufous cinnamon; tail-feathers pointed.

Tarsus, 25–26; culmen, from base 20–21, exposed 14–17 (in adult males).

| | WING | TAIL |
|---|---|---|
| ♂ ad. | 91–95(92.4) | 62–67(64.5) |
| ♀ ad. | 88–90(89.1) | 60–65(62.1) |

RANGE.—Utupua Island, Santa Cruz Islands.

Like most species that tend to geographical variation, the thick-heads are represented on Utupua by a very distinct form. The male is rather similar to the Vanikoro bird, while the female shows an apparent tendency toward the race that lives on Santa Cruz Island.

**Pachycephala pectoralis ornata**, new subspecies

TYPE.—No. 218022, Amer. Mus. Nat. Hist.; ♂ ad.; Santa Cruz, Santa Cruz Islands; February 24, 1927; R. H. Beck and F. P. Drowne.

ADULT MALE.—Similar to that of *utupuæ*, but all colors richer; black of breast-band deep and glossy; yellow of abdomen and under tail-coverts golden orange; white feathers on lower part of throat elongated and partly covering the breast-band, as in *mentalis;* upperside very different from that of *utupuæ*, not only the head, but

also back, scapulars, rump, upper tail-coverts and part of the wing being black; no signs of a yellow collar on hind neck; alula and primary-coverts entirely black; other wing-coverts and quills black with narrow olive edges; tail-feathers black, tips sometimes with narrow olive edge.

ADULT FEMALE.—Upperside fairly similar to the female of *utupuæ*, but back and edges of wing-feathers still more brownish, less olive; head and ear-coverts less grayish, more fuscous and drab; whole underside washed with cinnamon, only chin whitish; throat, lower cheeks and sides of throat pale cinnamon, feathers with darker tips; cinnamon breast-band indistinct, gradually merging into throat and abdomen; lower breast, upper abdomen and flanks cinnamon-yellow, middle of abdomen almost pure lemon; axillaries and under wing-coverts yellowish white; tail buffy citrine.

IMMATURE (first-year plumage).—Similar to adult female, but bill brownish, not black; tail-feathers pointed; crown duller brownish, less tinged with olive; male less cinnamon below, belly purer yellow, and throat more whitish; edges of wing-coverts and wing-feathers edged with (brownish) olive; female duller underneath, more strongly washed with cinnamon; wing-coverts and wing-feathers with rufous (olive) edges.

Tarsus, 26; culmen, from base 19–22(21), exposed 15–18 (in adult males).

| | | WING | TAIL |
|---|---|---|---|
| Santa Cruz, Santa Cruz Isls. | ♂ ad. | 94–97(95.7) | 65–69(66.8) |
| | ♀ ad. | 89–94(91.6) | 61–66(64.0) |
| Nepani, Swallow Isls. | ♂ ad. | 90–95(93.0) | 65, 68 |
| | ♀ ad. | 88, 93 | 64, 65 |
| Lomlom, Reef Isls. | ♂ ad. | 94–98(96.2) | 64–70(66.3) |
| | ♀ ad. | 90–93(91.5) | 61–65(63.7) |
| Treasurers Isl., Duff Isls. | ♂ ad. | 93–97(94.3) | 62–65(64.2) |
| | ♀ ad. | 87–91(88.7) | 60–63(61.0) |
| Disappointment Isl; Duff Isls. | ♂ ad. | 92–97(94.2) | 61–65(63.6) |
| | ♀ ad. | 89–94(90.5) | 60–64(62.0) |

RANGE.—Northern Santa Cruz group.

This handsome bird has a superficial resemblance to *P. p. melanonota* Hartert by its black back, but differs by the coloration of the underparts and by the olive edges of the wing-feathers. As a matter of fact it is more closely related to some of the Fijian species.

The birds from the Reef and Duff Islands agree with those from Santa Cruz, but the females, on the average, have the back purer olive and the head more grayish. There are no differences in size, as the table of measurements shows.

### *Pachycephala* IN THE FIJI GROUP

In 1891, H. Seebohm published a paper "On the Fijian species of the genus *Pachycephala*,"[1] in which he gave a complete revision of all the forms known at that time, and in which he corrected the numerous

[1]Ibis, 1891, pp. 93–99.

mistakes made by earlier authors. No further progress has been made in the last forty years, and the arrangement proposed by Seebohm has been considered, up to the present time, as fundamentally correct.

The splendid collections of the Whitney South Sea Expedition, containing more than 300 skins from 18 islands, and our newer views concerning taxonomy and nomenclature make a complete revision necessary.

To tell in advance some of the results, it turns out that no island is inhabited by two forms: that is, all the forms replace one another. Furthermore, we have the same phenomenon as in the Solomon Islands,[1] that apparently two waves of immigrants have reached the islands. The birds on the large islands (Viti Levu and Vanua Levu), with the whole underside yellow and with two frontal spots, apparently represent the original stock. The birds with white throats and black breast-bands living on the outlying islands (Kandavu, Ngau, and Lau Archipelago), are similar to the thickheads from the New Hebrides and Australia, and apparently are more recent immigrants. On a score of islands (Ovalau, Taviuni, etc.), both waves met and formed hybrid populations, in the same way as the thickhead on Whitney Island in the Solomon Islands was developed. The perfect hybridization exhibited on these islands necessitates the inclusion of both groups in one species, in spite of the strong differences in color pattern.

### **Pachycephala pectoralis kandavensis** Ramsay

*Pachycephala kandavensis* Ramsay, 1876, Proc. Linn. Soc. N.S.W., I, p. 65, Kandavu, Fiji Islands.

Adult Male.—Similar to the males of the *chlorura*-group, but bill shorter; green of upperside darker, duller and less olive, about light yellowish-olive (R.XXX); yellow of underside also less bright; black breast-band much narrower.

Adult Female.—Somewhat similar to that of *atrata*, but back purer olive; yellow on underside more reduced. Crown hair-brown, lighter and more cinnamon on forehead (Drab, R.XLVI); superciliary, ear-coverts, and sides of head deep cinnamon; back, tail, and edges of primaries dark buffy-olive (R.XXX); upper tail-coverts and edges of secondaries of the same color, but mixed with cinnamon; chin whitish, upper throat light pinkish-cinnamon, lower throat slightly darker; breast, abdomen and flanks between cinnamon-buff (R.XXIX) and honey yellow (R.XXX), in some specimens more cinnamon, in some less so; under tail-coverts cinnamon-yellow; under wing-coverts and axillaries pale buff.

Immature Male.—Similar to adult female, but[2] underside lighter, slightly washed with olive; under tail-coverts more strongly washed with yellow; upperside more olive, especially on head and tail.

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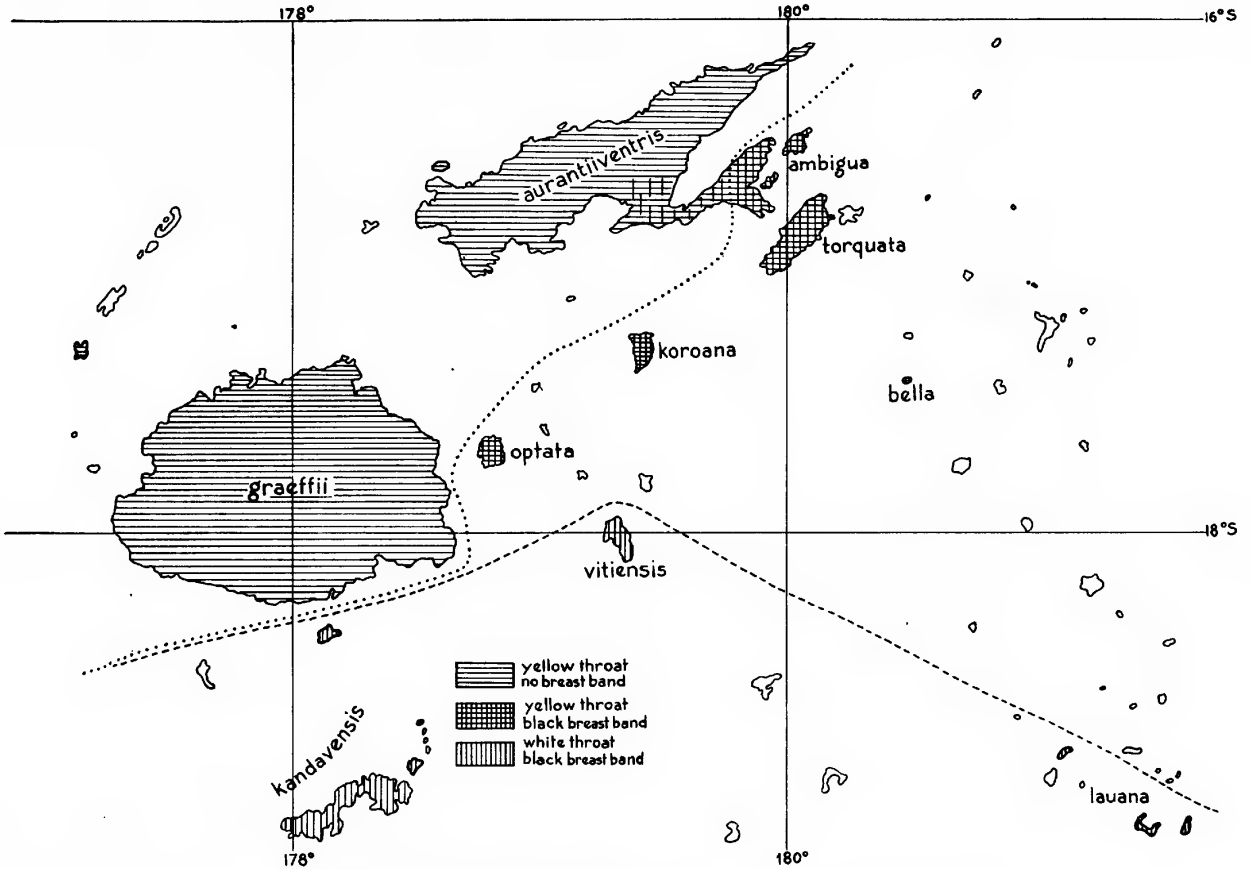
[1] See Amer. Mus. Novit., No. 522, pp. 5, 7–10.

[2] The characters common to all the forms of young *Pachycephala pectoralis* (color of bill and wing-coverts, structure of body-plumage, shape of first primary and of tail) have been mentioned on p. 4. Here I record only the peculiarities of this subspecies.




Geographical Variation of *Pachycephala pectoralis* on the Fiji Islands.

The map illustrates the extreme localization of the races and shows the distribution of the two main groups and of the intermediate forms. The islands without shading were also visited by the Whitney Expedition, but no thickheads were found there.

IMMATURE FEMALE.—In coloration about intermediate between adult female and immature male.

JUVENAL.—The whole body plumage is uniform rufous. Most of the immature specimens still have the remains of this soft nestling plumage.

Tarsus, 23–25 (23.5); culmen, from base 17–18 (17.3), exposed 11–14.

| | | WING | TAIL |
|---|---|---|---|
| Kandavu group | ♂ ad. | 87–92(89.8) | 65–68(65.9) |
| | ♀ ad. | 85–88(86.8) | 63–66(64.4) |
| Mbengha Island | ♂ ad. | 88–92(89.5) | 65–68(66.5) |
| | ♀ ad. | 88, 88 | 65, 65 |

RANGE.—Kandavu group (Vanua kula, Kandavu, and Ono) and Mbengha Island, Fiji Islands.

The birds from Mbengha Island agree very well with those from Kandavu, although Viti Levu is much closer. The only difference that I can see is that the females have the crown slightly more grayish.

### **Pachycephala pectoralis lauana**, new subspecies

TYPE.—No. 252695, Amer. Mus. Nat. Hist.; ♂ ad.; Ongea Levu Island, Lau Archipelago, Fiji Islands; July 28, 1924; R. H. Beck and J. G. Correia.

ADULT MALE.—Upperside similar to *vitiensis*, but back more blackish; underside similar to *kandavensis*, but breast-band wider. Head and hind neck glossy black, yellow nuchal collar very narrow, sometimes interrupted; back dusky olive, centers of feathers on fore-back blackish; rump lighter (dark greenish-olive); upper tail-coverts black with broad dark-olive tips; tail-feathers black with grayish tips; throat white, base of all feathers blackish; breast-band narrow, but wider than that of *kandavensis;* breast, abdomen and under tail-coverts lemon to lemon-chrome; axillaries white, with gray bases and lemon tips; under wing-coverts black and white; carpal edge black and pale lemon; wing as in *vitiensis*, but olive edges on wing-coverts and grayish-olive edges on secondaries narrower.

ADULT FEMALE.—Similar to that of *kandavensis*, but larger, with less lipochrome; underside decidedly paler and the yellow tinge of the pale cinnamon colors almost entirely restricted to the under tail-coverts; forehead and crown darker and more grayish; back and tail duller, more brownish and less olive; edges of wing-feathers rufous cinnamon with very little or no olive tinge.

IMMATURE.—With the usual immature characters on bill, wing and tail; otherwise like the adult female; young males have the back richer olive than young females.

Tarsus, 27; culmen, from base 19–20 (19.7), exposed 14–16.

| | | WING | TAIL |
|---|---|---|---|
| Ongea Levu | ♂ ad. | 93–98(95.8) | 63–67(64.8) |
| | ♀ ad. | 92–96(93.9) | 63–67(65.0) |
| Fulanga | ♂ ad. | 98, 100 | 68, 68 |
| Wangava | ♂ ad. | 96–100(97.7) | 66–71(68.1) |
| | ♀ ad. | 90–95(92.7) | 61–66 |

RANGE.—Southern Lau Archipelago (Ongea Levu, Fulanga and, Wangava).

This interesting melanistic form seems to be restricted to the above-mentioned three islands. The Whitney Expedition has also collected on all the other islands of the Lau group and did not encounter this species.

The two males from Fulanga are rather more blackish on the back than the other birds, but as the island lies between Ongea Levu and Wangava, I consider the difference as not sufficient for separation.

**Pachycephala pectoralis vitiensis** Gray

*Pachycephala vitiensis* G. R. Gray, 1859, 'Cat. Birds Trop. Islands,' p. 20, Feejee Islands (island of Ngau).

Adult Male.—Underside similar to that of *ornata*, the black breast-band being broad, and breast and abdomen of a rich, golden yellow; black of head intense and almost glossy; scapulars and back dark greenish-olive, feathers on upper back with black shafts; primaries edged pale olive-gray, secondaries with dull grayish-olive; tail black, tips of tail feathers lighter (pale olive-gray).

Adult Female.—In general style of coloration similar to the female of *kandavensis*, but all colors much richer; whole underside ochraceous orange (R.XV), on throat duller (more like pinkish-cinnamon, R.XXIX), on the middle of the abdomen lighter (more like ochraceous buff, R.XV); forehead, crown and hind neck dark mouse-gray; lores blackish, superciliary fuscous; ear-coverts umber-brown; back brownish-olive, richer olive toward the rump; tail-feathers dull brownish-gray tinged and edged with olive, paler on tips; wing-feathers edged with olive, cinnamon-olive or rust color.

Immature Male (II. Phase).—Similar to adult female, but underside lighter, abdomen more washed with yellow; upperside less washed with brownish; head purer gray (partly blackish), back purer olive; bill black, wing-coverts edged with olive; tail feathers not pointed.

Immature Male (I. Phase) and Female.—Similar to adult female, but on bill, wing, and tail with the characters of immaturity; no contrast between crown and back, the crown being suffused with olive; ear-coverts brownish; edges of wing-coverts and wing-feathers washed with brownish.

Tarsus, 25–26 (25.7); culmen, from base 19, exposed 15 (in adult males).

| | Wing | Tail |
|---|---|---|
| 9 ♂ ad. | 89–93(91.1) | 59–65(61.7) |
| 9 ♀ ad. | 86–89(88.1) | 58–61(59.3) |

Range.—Ngau Island, Fiji Islands.

The types of this subspecies were apparently unique before the activity of the Whitney Expedition. Seebohm states (Ibis, 1891, p. 99) that the typical specimens were collected by Dr. Rayner during the cruise of the 'Herald' (1845–1851), but so far as I can make out the 'Herald' never visited the Fiji Islands; neither was Dr. Rayner one of the members of that expedition, so I suppose Seebohm must have made a mistake.

These three subspecies (*kandavensis*, *lauana*, and *vitiensis*) form the group of the white-throated thickheads in the Fiji Islands. The following five subspecies form another group which is intermediate between the white-throated birds with a black breast, and those with uniform yellow underparts. All these forms have a yellow throat and a black breast-band. (See map, p. 11.)

**Pachycephala pectoralis bella,** new subspecies

TYPE.—No. 224036, Amer. Mus. Nat. Hist.; ♂ ad.; Vatu vara Island; October 2, 1924; R. H. Beck.

ADULT MALE.—Head black, large supraloral spots orange-yellow; yellow nuchal collar narrow, but uninterrupted; back and scapulars olive-green; upper tail-coverts black with indistinct yellowish-olive edges; tail-feathers black, with a yellowish-olive tip; throat light golden-orange, on chin with a few whitish feathers; black breast-band narrow; breast, abdomen, flanks and under tail-coverts brownish golden-orange; axillaries and under wing-coverts white with lemon tips; carpal edge lemon; alula and primary-coverts black; wing-coverts edged with olive, secondaries with grayish olive and primaries with pale gray.

ADULT FEMALE.—Somewhat similar to that of *kandavensis*, but lacking the olive tones on the upperside almost completely except on tail. Crown and hind neck dark rufous-brown (between bister, R.XXIX, and mummy brown, R.XV), back lighter and less rufous, almost without any traces of olive, brighter on rump; ear-coverts tawny (R.XV); underparts pinkish cinnamon-buff (R.XXIX), lighter on chin and on the middle of the abdomen, darker on the breast; under tail-coverts washed with pale lemon; wings fuscous, wing-coverts and secondaries edged with russet brown.

There are some "male" feathers in both females. One bird (No. 252740) has a few yellow feathers on the throat and two blackish feathers on the hind neck. The other specimen (No. 224038) has the supraloral region on the right side extensively yellow, numerous black or blackish feathers above the right eye, and many yellow feathers on breast and flanks; the edges to the wing-coverts and secondaries are also more grayish olive, than russet brown. Both specimens are sexed as nesting females.

Tarsus, 25; culmen, from base 18, exposed 13 (in the type).

| | WING | TAIL |
|---|---|---|
| 1 ♂ ad. (type) | 94 | 61 |
| 2 ♀ ad. | 91, 92 | 62, 66 |

RANGE.—Vatu vara Island, Fiji Islands.

More material is required before it can be definitely stated whether this marked subspecies is due to hybridization or else acquired its intermediate characters by convergency. The presence of the yellow supraloral spots speaks for a close relationship with the *aurantiiventris-græffii* group.

**Pachycephala pectoralis koroana,** new subspecies

TYPE.—No. 252809, Amer. Mus. Nat. Hist.; ♂ ad.; Koro Island, Fiji Islands; December 20, 1924; R. H. Beck.

ADULT MALE.—Similar to *torquata* Layard, with the tail blackish, throat yellow, and back dark olive; but black breast-band wider; yellow of underside deeper orange, on lower flanks and under tail-coverts almost ochraceous; whitish axillaries and under wing-coverts more strongly washed with yellow; color of back very variable, in some specimens (as No. 252810) very blackish with only the tips of the feathers olive, in other birds dark citrine (extreme: No. 252808); the olive tones always more mixed with brownish than in *torquata*, which shows best on the upper tail-coverts and the edges of the wing-feathers.

ADULT FEMALE.—Fairly similar to the female of *torquata* and indistinguishable from some specimens of the Taviuni race; only slight individual variation. Not much difference between the color of head and back; head dark grayish-brown, back richer and more warmly colored, sometimes more rufous, sometimes more olive; upper tail-coverts dark chestnut or fuscous olive; underside ochraceous cinnamon, more rufous on breast and flanks, throat and middle of abdomen lighter; tail blackish fuscous with brownish olive or rufous edges, and paler tip, wing-coverts and wing-feathers with rufous or cinnamon-rufous edges; bill black; two of seven specimens have a few yellow feathers on breast and abdomen.

IMMATURE MALE (II. Phase; 3 specimens).—Similar to adult female, but underneath lighter, more ochraceous, less rufous; back more washed with olive, less with rufous brown; some of the feathers of the crown partly blackish; wing and tail of the shape of an adult female; all three birds are molting on throat and wing-coverts into the adult plumage.

IMMATURE MALE (I. Phase) AND FEMALE.—Similar to the adult female, but upperparts duller, underparts lighter; most specimens still have large patches of the soft, uniformly rufous, nestling plumage; signs of immaturity on bill, wings and tail.

Tarsus, 26–27; culmen, from base 19, exposed 13–14 (in adult males).

| | WING | TAIL |
|---|---|---|
| 6 ♂ ad. | 92–97(95.2) | 67–71(68.7) |
| 6 ♀ ad. | 91–94(92.2) | 65–68(66.3) |

RANGE.—Koro Island, Fiji Islands.

This form, somewhat intermediate in its characters between the *vitiensis* group and the *græffii* group, shows very little individual variation and can therefore not be considered a hybrid population. In the characters of both sexes, although clearly belonging to a distinct stock, this subspecies (as well as *torquata* and *optata*) shows more affinity to *vitiensis* than to *aurantiiventris*.

**Pachycephala pectoralis torquata** Layard

*Pachycephala torquata* LAYARD, 1875, Proc. Zool. Soc. London, p. 150, Taviuni Island, Fiji Islands [also Ibis, 1876, p. 146].

ADULT MALE.—Similar to that of *koroana* (see above, where the differences have been described); differs from *aurantiiventris* Seebohm by having forehead and lores

entirely black, the black breast-band well developed and not interrupted in the middle, the yellow band across the hind neck more distinct, and the gray or olive-gray edges of the wing-feathers more washed with brownish.

ADULT FEMALE.—Extremely variable. Some are indistinguishable from the ventrally uniform cinnamon females of *koroana* (see p. 15), while others approach the color pattern of *aurantiiventris* females. The specimen most extremely developed in this direction is No. 252770, which may be described as follows: head dusky gray, feathers with olive-gray edges which are lighter and more olive-cinnamon on the forehead; back dull olive-gray, more citrine gray toward the rump; upper tail-coverts cinnamon-olive; tail-feathers fuscous with dull (grayish) olive edges; edges of primaries drab, edges of secondaries dull cinnamon, of wing-coverts olive-cinnamon; upper throat whitish, lower throat buffy, feathers with dark grayish shaft-streaks; lower cheeks buff mixed with pale yellow; breast grayish cinnamon-buff, abdomen and flanks pale cinnamon-buff, whitish in the middle of the belly; under tail-coverts cinnamon-buff with a yellow wash; feathers of breast, upper abdomen, and upper flanks with indistinct grayish shaft-stripes; this specimen combines the characters of the females of *koroana* and *aurantiiventris*.

IMMATURE FEMALE.—Very variable as adult female, with the usual signs of immaturity on bill, wings, and tail.

Tarsus, 27–27.5; culmen, from base 19–20, exposed 13–14 (in adult males).

| | WING | TAIL |
|---|---|---|
| 10 ♂ ad. | 93–98(95.6) | 63–71(66.8) |
| 8 ♀ ad. | 90–94(91.9) | 63–68(65.2) |

RANGE.—Taviuni Island, Fiji Islands.

The extreme individual variation of the females points to an admixture of *aurantiiventris* or *ambigua* blood.

**Pachycephala pectoralis ambigua,** new subspecies

TYPE.—No. 252825, Amer. Mus. Nat. Hist.; ♂ ad.; Rambi Island, Fiji Islands; December 4, 1924; R. H. Beck and J. G. Correia.

ADULT MALE.—Similar to that of *torquata* but width of black breast-band in most specimens much reduced (in fourteen specimens from Rambi Island, three have the breast-band wide, three narrow, five very narrow, and three interrupted; in three males from Kio Island, one has the breast-band narrow and two very narrow, while, in ten males from Taviuni, seven have the breast-band wide, two narrow, and one very narrow); the head is entirely black in twelve specimens, but two birds (Nos. 252857 and 252824) have a few yellow feathers in the supraloral region; the chin in many specimens, and the upper throat in a few specimens are whitish; the lower part of the outer edge of the primaries is purer gray than in *torquata;* the back is more citrine and less mixed with blackish.

ADULT FEMALE.—Very variable, but similar to the females of *aurantiiventris*. Although undoubtedly mature, all the five adult females from Rambi and two adult females from Kio, have characters that in other races indicate immaturity. The bills are brown instead of black and the wing-coverts have rufous edges, but the shape of the tail and the color of the primary-coverts, as compared with typical immature birds from the same islands, prove their maturity. In all seven specimens (collected

December, 1924) the gonads are indicated as small. Each of the seven specimens is somewhat different, but all except one (No. 252673, which belongs to the brownish phase) have the streaking of the underside more pronounced than the females of *torquata*. Five specimens have under tail-coverts and thighs washed with yellow; three specimens have the lower cheeks distinctly, two indistinctly washed with yellow; the upper surface shows every intergradation between rufous earth-brown and dull olive-gray; the wing-coverts and secondaries are edged with rufous or rufous cinnamon, the primaries with cinnamon to grayish drab; the ground color of the underside varies from buffy cinnamon to grayish white, on the breast sometimes with an olive tinge. All the specimens show distinct brownish to grayish shaft-streaks on throat and breast and a few obsolete ones on the lower abdomen and the flanks; the breast is darker, washed with grayish or drab; concerning the coloration of the upperside, two specimens belong to the olive-gray type, one is intermediate and four more rufous brown; concerning the underside, four specimens belong to the grayish type, one is intermediate and two represent the buffy cinnamon phase.

IMMATURE.—Similar to adult female, but still more variable; males usually characterized by the stronger olive tinge of head, back, and tail.

Tarsus, 25–27 (25.8); culmen, from base 19, exposed 13–14 (in adult males).

| | WING | TAIL |
|---|---|---|
| 18 ♂ ad. | 90–95 | 64–68 |
| 8 ♀ ad. | 89–92 | 64–68 |

All the specimens (collected December 3–8, 1924) are badly molting.

RANGE.—Rambi Island, Kio Island, and Thakaundrove Peninsula of Vanua Levu.

This subspecies, the males of which resemble those of *torquata* and the females those of *aurantiiventris*, seems not to be restricted to the islands of Rambi and Kio, but also to have settled on the southeastern peninsula of Vanua Levu. A male collected there by the Whitney Expedition has a well-developed breast-band. How far on Vanua Levu the influence of *ambigua* reaches is not yet certain. A series from Savu-savu Bay (south coast) still shows traces of the black breast-band, while birds collected on the western and northern coast of Vanua Levu are typical *aurantiiventris*.

### **Pachycephala pectoralis optata** Hartlaub

*Pachycephala* (*?*) *optata* HARTLAUB, 1866, Ibis, p. 172, Ovalau Island.

*Pachycephala neglecta* LAYARD, 1879, Proc. Zool. Soc. London, p. 147, Ovalau Island.

*?Pachycephala intermedia* LAYARD, 1876, Ibis, p. 154, Tai Levu, northeast Viti Levu.

ADULT MALE.—Similar to *ambigua*, but back more olive, less brownish citrine; in two of five males there are a few yellow feathers in the supraloral region; underside lemon-chrome, not golden orange; chin and upper throat sometimes whitish; of five specimens, the breast-band is complete in one, narrowly interrupted in two, and

broadly interrupted in two; tail black, with pale grayish-olive tips; edges of primaries dull grayish or drab, of secondaries olive, not grayish-olive; edges of wing-coverts olive with hardly any yellowish tinge.

ADULT FEMALE.—Very variable. Each of the four adult females represented in the collection looks as if it belonged to a different subspecies: one (No. 252797) belongs to the rufous phase: one (No. 252915) is entirely cinnamon underneath; two other birds (Nos. 252914 and 224031) are buffy and yellowish-white on the middle of the abdomen, while the sides of the throat, the breast, the flanks, and the under tail-coverts are more or less strongly washed with cinnamon. The two specimens first mentioned are uniformly colored underneath, while the two other birds have a mottled appearance underneath. No. 252914 has gray shaft-stripes on throat, breast, and flanks,and No. 224031 has narrow rufous bars across the tips of the feathers on throat and breast; back and head are dark olive, more or less mixed with brownish; the edges of wing-feathers and wing-coverts are rufous; the bill is black in all four specimens.

IMMATURE MALE.—There are three immature males in the collection that, except for the characters of immaturity, are fairly similar to the adult females. Two of the specimens belong to the rufous-brown phase, and one to the grayish-olive.

Tarsus, 26–27; culmen, from base 19–20, exposed 13–14 (in adult males).

| | WING | TAIL |
|---|---|---|
| 6 ♂ ad. | 91–94(92.7) | 65–70(67.0) |
| 4 ♀ ad. | 92, 93 | 63, 64, 66 |

RANGE.—Ovalau Island, Fiji Islands.

Hartlaub described the species from a single female, and Layard redescribed the bird, apparently not being able to make out Hartlaub's description. This subspecies forms the transition from *koroana* to *græffii*, as do *torquata* and *ambigua* between *koroana* and *aurantiiventris*. The high individual variation is evidence of a biphyletic origin of the form.

This concludes the group of forms in which the males have a yellow throat and a black breast-band, while the females show considerable variation. There remain two forms to be discussed, *græffii* and *aurantiiventris*, constituting a group in which the males have the underparts entirely yellow, the yellow frontal patches always present, and in which the females have always a conspicuous pattern of spotting or striping.

### **Pachycephala pectoralis græffii** Hartlaub

*Pachycephala græffii* HARTLAUB, 1866, Ibis, p. 172, Viti Levu, Fiji Islands.

?*Pachycephala intermedia* LAYARD, 1876, Ibis, p. 154, Tai Levu, northeast Viti Levu.

ADULT MALE.—Crown, hind neck, lores, upper cheeks, ear-coverts and sides of neck black; two supraloral spots or whole forehead lemon-chrome; back dark olive-green, yellowish-olive collar in hind-neck only indicated; upper tail-coverts olive; tail black, tips of central tail-feathers blackish, edge of inner web of the outer tail-

feathers whitish; entire underside yellow (lemon-chrome), lighter, sometimes almost whitish on chin; richer, more orange on breast and upper abdomen; black patch on both sides of upper breast only indicated; flanks somewhat washed with grayish olive; wing-feathers blackish; edges of primaries pale neutral gray, of secondaries and primary-coverts grayish olive; edges of wing-coverts yellowish olive, the tips sometimes pale yellow.

ADULT FEMALE.—Very variable and practically indistinguishable from the females of *aurantiiventris*. Two of nine specimens have the upper side of the chestnut phase, two more or less olive, but five are intermediate. The lower cheeks, the supraloral and superciliary region, and the circumocular feathers are always more or less washed with yellow; thighs and under tail-coverts are in most specimens slightly washed with yellow; the coloration of the underside shows less individual variation than the upperside, all the birds showing the same pattern. Lower mandible never entirely black.

IMMATURE MALE.—Similar to adult female, but throat and breast often washed with yellow; yellow marks on head more pronounced; back and tail on the average more olive; tail strongly pointed.

IMMATURE FEMALE.—Except for a slight rufous wash on the underside and the shape of tail and primary-coverts, it is indistinguishable from adult females.

Tarsus, 26–28 (27); culmen, from base 18.5–19.5, exposed 13–14 (in adult males).

| | | WING | TAIL |
|---|---|---|---|
| Viti Levu | 13 ♂ ad. | 93–101(95.8) | 67–74(70.6) |
| | 9 ♀ ad. | 91–95(92.8) | 67–71(69.0) |
| Waia | 8 ♂ ad. | 91–96(93.5) | 65–72(68.6) |

RANGE.—Viti Levu and Waia, Fiji Islands.

Specimens from Waia Island cannot be separated subspecifically, although the males are, on the average, paler yellow underneath and have less whitish on the tips of the outer tail-feathers, and the females are usually purer gray underneath, more olive above and with more yellow on the under tail-coverts. However, I do not regard these characters as sufficient for a subspecific separation, since the difference is widely bridged by individual variation.

Layard described in 1876 a single male with complete black breast-band under the name *intermedia*. The type locality is Tai Levu, a cape of Viti Levu, opposite to Ovalau. The type specimen was apparently lost later on, and the question remains: what form occurs on the Fijian mainland opposite Ovalau? Does the island form *optata* occupy part of the mainland, as does *ambigua* on Vanua Levu, or was the type of *intermedia* an exceptional extreme? More specimens (including females) have to be collected before this question can be answered. All the specimens collected on Viti Levu by the Whitney Expedition are typical *græffii*.

*P. p. græffii* is very closely related to *P. p. aurantiiventris*, but differs in the male sex by the much lighter coloration of the underparts.

**Pachycephala pectoralis aurantiiventris** Seebohm

*Pachycephala aurantiiventris* SEEBOHM, 1891, Ibis, p. 96, Vanua Levu Island, Fiji Islands.

ADULT MALE.—Head black with two yellow supraloral spots which sometimes combine to form a broad frontal band; back olive, more greenish, less citrine than in *ambigua*; tail and wing as in *ambigua*, but edges of wing-coverts still more yellowish, tail-feathers black with pale olive-gray tips; primaries with pale neutral gray edges, secondaries with olive-gray edges; yellow nuchal collar reduced; underside golden orange, on the sides of the breast with remains of the black band of the related forms; in fifteen males, twelve have just a small triangular black patch on both sides of the upper breast; in three specimens it forms a breast-band broadly interrupted in the middle of the breast.

ADULT FEMALE.—Only two specimens were collected on Vanua Levu and one on Yanganga; thus, not much can be said about the individual variation. All three fall within the range of variation of the females of *ambigua*, as described above.

Crown, back, scapulars, and rump dark brown (mummy brown, R.XV), forehead lighter and somewhat washed with olive, nuchal collar sometimes indicated; lores darker, fuscous; ear-coverts lighter, lower cheeks and under tail-coverts slightly washed with yellow, ground color of underparts a pale buffy gray, darker on the breast, lighter, almost whitish in the middle of the throat and abdomen; feathers of throat and breast with shaft-streaks and grayish cross-bars, on abdomen and flanks only with pale, but broad, shaft-streaks; axillaries whitish or pale gray, under wing-coverts gray with whitish or pale yellow edges; wing and tail dark brown; edges of wing-coverts and secondaries russet; edges of primaries lighter and more grayish.

IMMATURE MALE AND FEMALE.—Similar to the adult female, but with the usual signs of immaturity. Immature males often strongly washed with olive on the upperside, and with yellow on the cheeks and circumocular region.

Tarsus, 25–26; culmen, from base 18–19, exposed 13–14 (in adult males).

| | WING | TAIL |
|---|---|---|
| 14 ♂ ad. | 89–94(91.3) | 63–70(66.2) |
| 3 ♀ ad. | 86, 86, 87 | 63, 64 |

RANGE.—Yanganga Island and Vanua Levu (except southeastern peninsula).

Birds collected on Yanganga Island, on the north coast (opposite Mathuata) and on the west coast (Mbuabay), are typical. However, from five males collected on Savu-savu Bay (south coast), three have the breast-band almost complete and also have the loral spots only small. It is here that the intergradation with *ambigua* takes place.

### *Pachycephala* IN CENTRAL POLYNESIA

In Polynesia east of the Fiji Islands, only two species of thickheads live. Both are obvious representatives of *Pachycephala pectoralis*, but both have acquired such distinct characters that it would be hazardous to include them in that species. Furthermore, the characters of these

species are linked together neither by the extremes of individual variation nor by hybridization as we find it in the Solomon Islands and in the Fiji group.

**Pachycephala melanops** (Pucheran)

*Eopsaltria melanops* PUCHERAN, 1853, 'Voy. Pôle Sud,' Zool. III, p. 56 (Atlas, Pl. v, fig. 2), Vavao, Tonga Islands.

*?Pachycephala jacquinoti* BONAPARTE, 1851, 'Consp. Gen. Av.,' I, p. 329 (*nomen nudum*).

ADULT MALE.—Head, sides of head, and throat black; rest of underside and nuchal collar rich yellow; back, scapulars, and edges of wing-coverts and secondaries bright yellowish olive (between pyrite yellow and citrine, R.IV); rump and upper tail-coverts yellowish olive; tail black, tips and bases of tail-feathers pale yellow; wing-feathers blackish, edges of primaries grayish or grayish olive.

ADULT FEMALE.—Crown gray (deep olive-gray, R.LI), on forehead, superciliary and postocular region washed with buff; back, scapulars, rump, and upper tail-coverts dull citrine, nuchal band yellowish citrine; ear-coverts cinnamon; upper throat white, tips of many feathers blackish, lower throat whitish, with a strong wash of cinnamon (buff) rest of the underside pale yellow (empire yellow, R.IV); tail-feathers fuscous citrine with pale yellow tips; wing-feathers fuscous with broad dull citrine edges on wing-coverts and secondaries, sometimes washed with cinnamon; edges of primaries more or less grayish.

IMMATURE MALE (II. Phase).—Intermediate in plumage between immature male (I. Phase) and adult male. Bill black, feathers on head partly blackish; back and tail brighter olive; belly brighter yellow; edges of wing-coverts olive.

IMMATURE MALE (I. Phase) AND FEMALE.—Similar to adult female, but bill pale brown; wing (especially coverts and secondaries) strongly mixed with russet; tail-feathers pointed and tips cinnamon (yellow); yellow of underparts much paler; in many specimens remains of the soft cinnamon-colored nestling plumage are still persisting; the crown seems to be the place where this plumage persists longest.

Tarsus, 26–27; culmen, from base 20–22, exposed 15–16 (in adult males).

| | | WING | TAIL |
|---|---|---|---|
| Vavau group | 14 ♂ ad. | 101–106(103.9) | 68–73(71.0) |
| | 13 ♀ ad. | 95– 99( 96.8) | 66–69(67.5) |
| Late | 4 ♂ ad. | 102–103(102.5) | 69–71(70.0) |
| | 1 ♀ ad. | 99 | 69 |

RANGE.—Vavau group (Vavau, Kapa, Ava, and Euakava) and Late, Tonga Islands.

This species is very rare in collections. The males somewhat approach *P. p. lauana* except for the entirely black throat, and the females, also somewhat similar to those of *lauana*, are surprisingly like those of *utupuæ*. This is another instance of how independently the same characters can crop out in far distant representatives of the species *Pachycephala pectoralis*.

**Pachycephala flavifrons** (Peale)

*Eopsaltria flavifrons* PEALE, 1848, 'U. S. Explor. Exped.,' Birds, p. 96, Upolu, Samoa.

*Eopsaltria icteroides* PEALE, ibidem, p. 97, Samoa.

*Eopsaltria albifrons* PEALE, ibidem, p. 97, Samoa.

*Pachycephala hombroni* BONAPARTE, 1851, 'Consp. Av.,' I, p. 329 (*nomen nudum*).

*Eopsaltria diademata* PUCHERAN, 1853, 'Voy. Pôle Sud.,' Zool. III, p. 55, Samoa.

ADULT MALE.—There are three color phases in this species of which I describe the most frequent one ("*icteroides*"). Upperside olivaceous black, more grayish on the crown, more olive on the rump; forehead and supraloral region yellow; lores, cheeks, and ear-coverts blackish; wings and tail black; wing-coverts edged with blackish olive, wing-feathers edged with drab or dark grayish; feathers of throat with dark gray bases and yellowish tips; breast, flanks, abdomen, and under tail-coverts yellow (rich lemon-chrome); axillaries and under wing-coverts white with a slight yellow tinge; tail-feathers sometimes with narrow cinnamon tips.

"*P. flavifrons*" phase similar, but tips of feathers on throat white, instead of yellow.

"*P. albifrons*" phase similar, but tips of feathers on throat and forehead white.

ADULT FEMALE.—Similar to adult male, except in the coloration of forehead and throat; no sharply outlined yellow spot on forehead, but forehead and supraloral region washed with grayish yellow; fore part of crown washed with yellowish olive; throat grayish, feathers with narrow yellow edges. The three color phases occur also in the females: some specimens have the throat, and some the throat and forehead without a yellowish wash.

IMMATURE MALE AND FEMALE.—Similar to adult female, but mandible not black, tail pointed, yellow of underside paler, and wing-coverts with rufous edges; in some specimens remains of the rufous nestling plumages persist on throat, flanks, and under tail-coverts; on the crown the feathers of the nestling plumage are dusky with dull olive or olive-brown edges.

The following table illustrates the proportions of the three color phases in the Whitney material.

| | Upolu | Savaii |
|---|---|---|
| "*albifrons*" | 1 ♂ ad. | 2 ♂ ad. 4 ♀ ad. |
| "*flavifrons*" | 1 ♂ ad. 2 ♀ ad. | 4 ♂ ad. |
| "*icteroides*" | 9 ♂ ad. 8 ♀ ad. | 8 ♂ ad. 9 ♀ ad. |

"*albifrons*" throat white, forehead white
"*flavifrons*" throat white, forehead yellow
"*icteroides*" throat yellow, forehead yellow

Tarsus, 24–25; culmen, from base 18.5–19, exposed 12–13 (in adult males).

| | | WING | TAIL |
|---|---|---|---|
| Upolu | 11 ♂ ad. | 86–89(87.6) | 58–62(60.6) |
| | 10 ♀ ad. | 81–86(83.8) | 51–59(56.5) |
| Savaii | 14 ♂ ad. | 84–90(86.8) | 55–62(58.5) |
| | 13 ♀ ad. | 82–85(83.5) | 54–60(56.2) |

RANGE.—Upolu and Savaii, Samoa Islands.

The birds from Savaii are indistinguishable from those from Upolu.

The individual variation in this species is highly interesting, as three distinct color phases exist. Judging from my figures, the presence of yellow on forehead and on throat is a dominant character. The material at hand is, however, not sufficient to draw any further conclusions. The ratio, 34:7:7, of my series does not come close to any of the expected ratios, of which 12:3:1 or 9:3:4 appear to be the most probable.

The most interesting feature is that "white throat" or "yellow throat" appear here as alternate characters in the same population. The yellow coloration of the throat has been used as a favorite argument against the inclusion of many Solomon Islands thickheads (*orioloides* group) and Fiji Islands thickheads (*græffii* group) in the species *Pachycephala pectoralis*. Here, in Samoa, in a representative species of thickheads, this character is of no systematic value at all.